

CLAIMS:

1. A method for routing a partially routed design of an integrated circuit, the design containing unrouted pins, the method comprising:

routing the unrouted pins to generate a first plurality of nets that contains a plurality of shorts or overlaps between nets;

analyzing the first plurality of nets to obtain timing information;

partitioning, based on the timing information, the first plurality of nets into a first and a second set of nets;

hiding the first set of nets;

rerouting a subset of the second set of nets to substantially remove all overlaps in the second set of nets;

unhiding the first set of nets; and

rerouting a subset of the first set of nets and a subset of the rerouted second set of nets to substantially remove the plurality of overlaps.

2. The method of claim 1 wherein the analyzing step includes calculating slack values for at least some of the plurality of nets and using the slack values in the partitioning step.

3. The method of claim 2 wherein the second set of nets are nets having pins with an associated slack value less than a predetermined value.

4. The method of claim 1 wherein the routing, rerouting the first set of nets and rerouting the second set of nets use different routing parameters.

5. The method of claim 4 wherein the routing parameters are used to determine costs associated with routing resources.

6. The method of claim 4 wherein the router parameters are adjusted so that one set of preferred nets is given preference to use routing resources.
7. The method of claim 6 wherein the routing resources used by the set of preferred nets are those having the best delay characteristics.
8. The method of claim 6 wherein the set of preferred nets is the set of nets having pins with low slack values.
9. The method of claim 1 wherein the step of rerouting the subset of the second set of nets further comprises a step of selecting one set of preferred nets that is given preference to use routing resources.
10. The method of claim 1 wherein the step of rerouting the subset of the first set of nets further comprising a step of selecting one set of preferred nets that is given preference to use routing resources.
11. The method of claim 1 wherein the design contains routed pins, and the routing step includes routing for a load pin on a net, the routing step comprises:
  - identifying source nodes for the routing of the load pin, based on the net's pre-existing routing;
  - assigning a cost for each of the source nodes;
  - generating a priority queue;
  - placing the source nodes in the priority queue;
  - removing a node having lowest cost from the priority queue; and
  - selecting one of two steps below:
    - if the removed node is a target load pin node, constructing a routing tree by collecting nodes on an uphill path from the target load pin node to one of the source nodes; and

if the removed node is not a target load pin node, adding to the priority queue nodes adjacent to the removed node and then performing the removing and selecting steps.

12. The method of claim 11 wherein the source nodes are assigned substantially zero costs.

13. The method of claim 11 wherein the source nodes are assigned costs based on timing.

14. The method of claim 11 wherein the source nodes are assigned costs based on characteristics of their corresponding conductors in the integrated circuit and their connectivity.

15. The method of claim 1 wherein the second set of nets contains routed pins, and the step of rerouting the second set of nets includes routing a load pin on a net in the second set of nets, the routing of the load pin comprises:

- identifying source nodes for the routing of the load pin, based on the net's pre-existing routing;
- assigning a cost for each of the source nodes;
- generating a priority queue;
- placing the source nodes in the priority queue;
- removing a node having lowest cost from the priority queue; and

- selecting one of two steps below:

- if the removed node is a target load pin node, constructing a routing tree by collecting nodes on an uphill path from the target load pin node to one of the source nodes; and

- if the removed node is not a target load pin node, adding to the priority queue nodes adjacent to the removed node and then performing the removing and selecting steps.

16. The method of claim 1 wherein the first set of nets contains routed pins, and the step of rerouting the first set

of nets includes routing a load pin on a net in the first set of nets, the routing of the load pin comprises:

- identifying source nodes for the routing of the load pin, based on the net's pre-existing routing;
- assigning a cost for each of the source nodes;
- generating a priority queue;
- placing the source nodes in the priority queue;
- removing a node having lowest cost from the priority queue; and

- selecting one of two steps below:

- if the removed node is a target load pin node, constructing a routing tree by collecting nodes on an uphill path from the target load pin node to one of the source nodes; and

- if the removed node is not a target load pin node, adding to the priority queue nodes adjacent to the removed node and then performing the removing and selecting steps.